IEI Technology Corp.

MODEL:

TDM Series

12.1"/15" LCD Monitor, Aluminum Front Panel

Wide Range Temperature, 9~36 V DC Input

User Manual

Rev. 2.00 – 14 December, 2010

RoHS Lead Free

Revision

Date	Version	Changes
14 December, 2010	2.00	Updated for R20 version
May 2007	1.11	-Added safety warning note for monitors used in high temperature areas (pg. iv) -AV-6600 AD Board CN25 connector pin 3 voltage changed to +9V~+36V input
April 2007	1.10	Updated Chapter 4: AV-6600 AD Board
December 2006	1.00	Initial release

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Safety Precautions

WARNING:

When the ambient temperature is above +50°C, please do the following:

- Only use monitors with a DC terminal block for power
- Place the monitor in a secure area accessible only to trained service persons

The monitor can operate in ambient temperatures up to +50°C; however, in such environments the temperature of the LCD monitor can be in excess of +70°C. When the monitor is installed in such environments, please strictly adhere to the two operational guidelines listed above.

- Prior to installing, moving, and modifying the monitor, make sure the power is turned off and the power cord is disconnected.
- Do not apply voltage levels that exceed the specified voltage range. Doing so will cause fire or an electrical shock.
- Electric shocks can occur if the panel is opened. Do not drop or insert any objects into the ventilation openings of the monitor.
- Only qualified engineers from certified system integrators or VARs are allowed to make necessary functional modifications to the monitor, e.g., adding a touch screen. IEI offers the customization service on a per-order basis.
- Designs with stand-alone and fault-tolerant hardware considerations should be implemented using the series models as a critical alarm or production line control.
- If considerable amount of dust, water, or fluids entered the monitor, turn off the power supply immediately, unplug the power cord, and contact the monitor vendor.

- Explosions may occur with installations in environments where flammable gases are present.
- Fault-tolerant and failsafe designs should be implemented with the use of the series models on transportation vehicles, ships, safety/security devices, or medical devices not related to life-support functionalities. Users/integrators should take the responsibility for implementations with adequate levels of reliability and safety.

FURTHER PRECAUTIONS

- Do not drop the monitor against a hard surface. Doing so will damage the display.
- Do not strike or exert excessive force onto the touch screen.
- Touching the touch screen using a sharp object will damage the LCD panel.
- Avoid environments exposed to direct sunlight, dust, or chemical vapors.
- The ambient temperature of the installation site should be observed and controlled to avoid overheating the monitor.
- Condensation might form inside the monitor chassis if exposed to sudden changes in temperature.
- Carefully route the power cord so that people cannot step on it. Do not place anything over the power cord.
- If the equipment should be left unused for an extended period of time, disconnect it from the power source to avoid damage by transient over-voltage.
- If any of the following situations arise, have the equipment checked by qualified service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment does not work properly, or cannot be made to work according to the user manual.
  - The equipment has been dropped and damaged.
  - The equipment shows obvious signs of damage.

WARNING:

Any changes or modifications made to the equipment that are not expressly approved by the relevant standards could void the authority to operate the equipment.

ADDITIONAL INFORMATION AND ASSISTANCE

MAINTENANCE AND CLEANING

Prior to cleaning any part or component of the monitor, please read the details below.

- Except for the properly installed front LCD panel, never spray or squirt liquids directly onto any other component. To clean the front panel, please rub it with a piece of soft dry cloth or a slightly moistened cloth.
- The interior of the LCD monitor does not require cleaning. Keep fluids away from the LCD monitor interior.
- Be cautious of all small removable components when vacuuming the monitor.
- Turn the system off before cleaning the LCD monitor.
- Never drop any objects or liquids through the openings of the LCD monitor.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the monitor.
- Avoid eating, drinking and smoking within vicinity of the monitor.

CLEANING TOOLS

Some components in the monitor may only be cleaned using a product specifically designed for the purpose. In such case, the product will be explicitly mentioned in the cleaning tips. Below is a list of items to use when cleaning the computer or computer peripherals.

- ***Cloth*** – Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the monitor.

- ***Water or rubbing alcohol*** – A cloth moistened with water or rubbing alcohol can be used to clean the monitor.
- ***Using solvents*** – The use of solvents is not recommended when cleaning the monitor as they may damage the plastic parts.
- ***Vacuum cleaner*** – Using a vacuum specifically designed for computers is one of the best methods of cleaning the monitor. Over dust and dirt can restrict the airflow in a computer and cause circuitry to corrode.
- ***Cotton swabs*** - Cotton swaps moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas.
- ***Foam swabs*** - Whenever possible, it is best to use lint free swabs such as foam swabs for cleaning.

ESD PRECAUTIONS

Observe all conventional anti-ESD methods while handling the components contained within the LCD should the need arise for adding a functionality. The use of a grounded wrist strap and an anti-static work pad is recommended. Avoid dust and debris or other static-accumulating materials in the work area.

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Chapter

1

Introduction

1.1 TDM-121GMS/150GMS LCD Monitor Overview

The TDM series is a Liquid Crystal Display (LCD) module. It is the latest member of IEI's line of RoHS-compliant sophisticated LCD designs. Utilizing the thin film transistor (TFT) technology, the TDM series offers crisp displays and bright resolutions while meeting the demanding operating requirements of rugged industrial applications. The TDM series is designed for applications that require minimum installation space and flexible configuration. The flat front panel provides IP 65 protection, which effectively wards off dust and water. Touch screens are also preinstalled.

1.1.1 Standard Features

All the models listed in **Section 1.2.1** have the following standard features:

- LCD monitor
- VGA
- XGA (1024 x 768 pixels) resolution
- Silver color
- Aluminum front
- RoHS compliance
- DE (Data Enable) only mode
- Low Voltage Differential Signaling (LVDS) interface
- Wide range operating temperature
- Wide viewing angle
- High contrast ratio
- Fast response time
- High color saturation

1.1.2 Model Variations

The TDM LCD series has four model variations listed in **Table 1-1**.

Model Number	LCD Size	9~36V Power Input	Touch Screen with RS-232 Interface	VGA	DVI
TDM-121GMS-R20	12.1”	Yes	Yes	Yes	Yes
TDM-150GMS-R20	15”	Yes	Yes	Yes	Yes

Table 1-1: TDM Series Model Variants

1.1.3 Applications

The TDM series industrial monitor is designed for rigorous industrial environments where it may be exposed to both heat and moisture. Its durability and strength also makes it an ideal choice for public access computers. Some possible applications include:

- Digital Surveillance
- X-ray imaging terminal
- Multimedia advertising platform
- General Computing
  - Computer-based testing center
  - General purpose information system
  - Mobile nursing station
  - Interactive education use
- Automation & Control
  - Plant environment monitoring
  - Factory automation HMI terminal
  - Shop-floor/MES control
- Self-service Kiosk
  - Full-service receptionist kiosk
  - Hospital self-registration terminal
  - Interactive photo kiosk
  - Video rental kiosk
  - Self-service POS terminal

1.1.4 Features

Some of the features of the TDM series industrial monitor include:

- IP 65 compliant aluminum front panel
- Wide range temperature support
- Analog VGA interface supports most general system boards
- RS-232 interface touch screen
- Up to 500 cd/m^2 high brightness and 50000hrs MTFB long lifetime panel
- Advanced thermal and air-flow design
- Supports panel, rack, wall, rail, stand and arm mounting
- 9 ~ 36V DC power input for mobile application
- Long product life support
- RoHS compliant
- Analog resistive type touch screen

1.2 External Overview

The TDM series industrial monitors are durable devices that can be used in harsh industrial environments. The following sections describe the physical layout of the TDM series industrial monitors.

1.2.1 Front View

The front of the TDM series industrial monitor is a flat panel TFT LCD screen surrounded by an aluminum frame. A control button panel (OSD) is located vertically on the right side of the frame with the following control buttons:

- LCD On/Off
- Auto
- Left
- Right
- Menu

The OSD panel also has one power LED.

Figure 1-1 shows the LCD monitor front view.

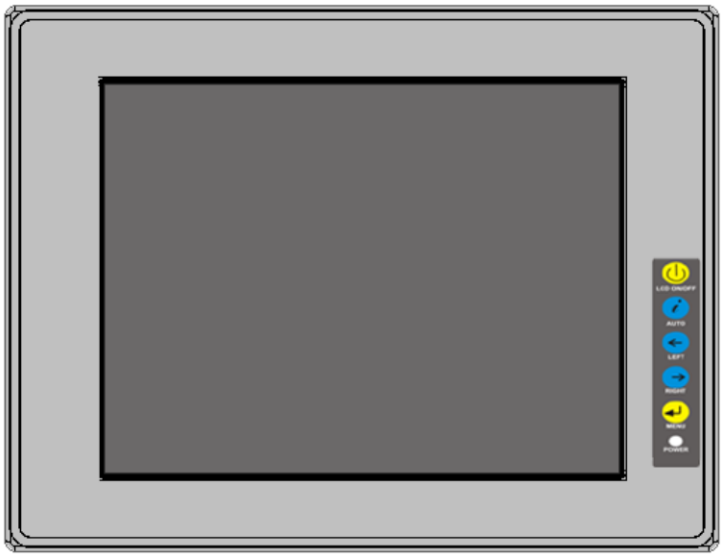

Figure 1-1: Front View

1.2.2 Rear View

The rear panel features fan ventilation holes and four retention screw holes that support a wall-mounting bracket. The retention screw holes are circled in **Figure 1-2**.

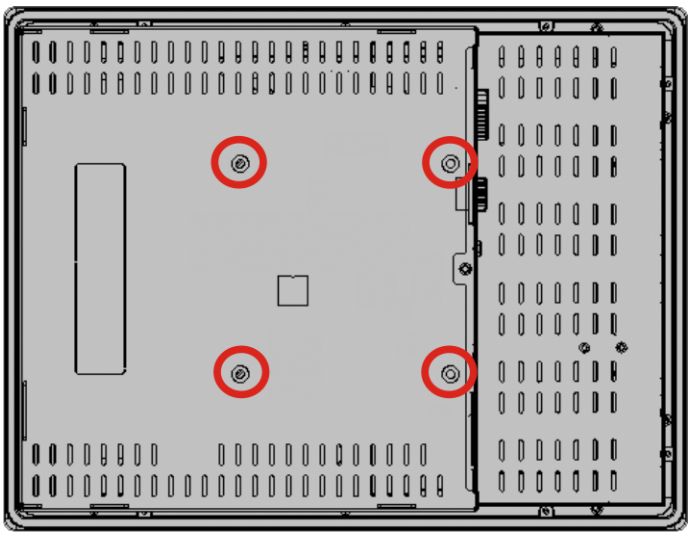

Figure 1-2: Rear View

1.2.3 Top View

The top view provides access to retention screws that secure the back cover to the chassis. The retention screw holes are circled in **Figure 1-3** below.

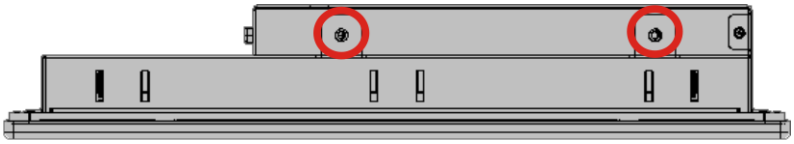

Figure 1-3: Top View

1.2.4 Bottom View

The bottom view provides access to retention screws that secure the back cover to the chassis. The retention screw holes are circled in **Figure 1-4** below.

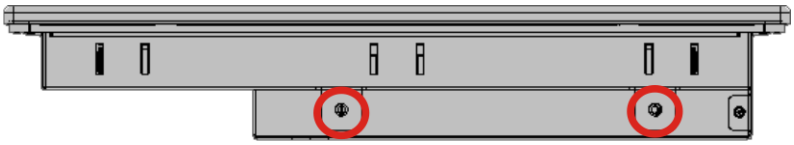

Figure 1-4: Bottom View

1.2.5 Side View

The rear panel shown in **Figure 1-5** has the following interfaces. See **Section 5.4.1** for the connector locations.

- 1 x RS-232 connector touch screen interface
- 1 x USB connector touch screen interface
- 1 x 9~36V DC terminal block
- 1 x 12V DC input connector
- 1 x VGA connector
- 1 x DVI-D connector

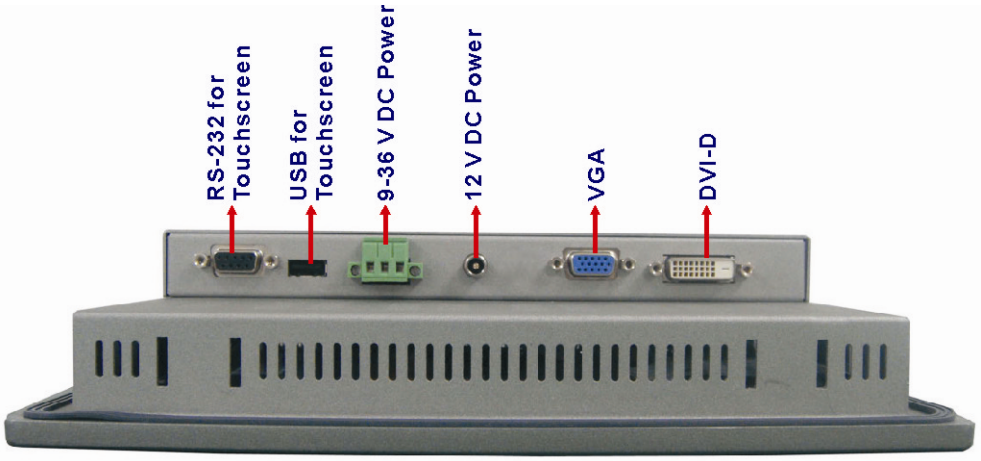

Figure 1-5: Side View

1.2.6 Frame

An aluminum frame surrounds the TDM series LCD monitor. This aluminum frame has small screw holes that are used to attach the LCD monitor to a rack mount kit for mounting into a rack or cabinet. The screw holes on TDM-121GMS are circled in **Figure 1-6**.

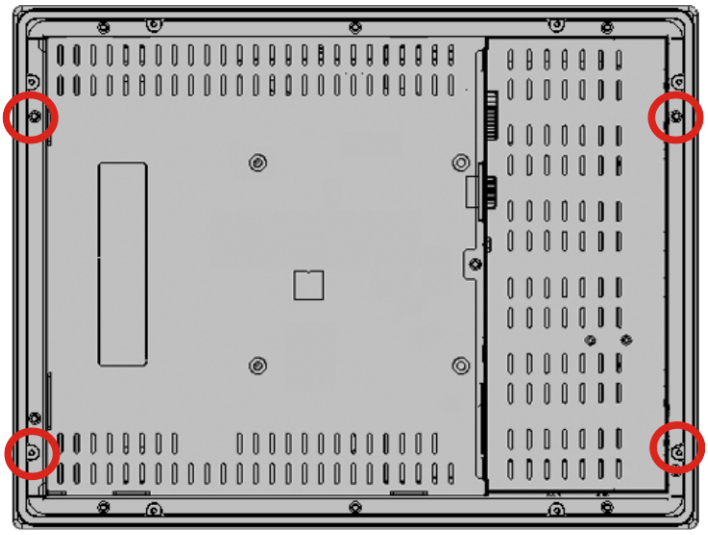

Figure 1-6: TDM-121GMS Frame Rear View (4 rack mount kit screw holes)

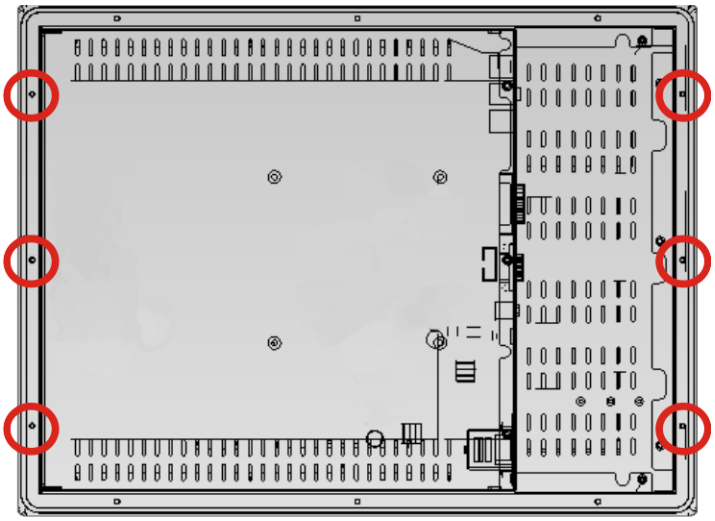

Figure 1-7: TDM-150GMS Frame Rear View (6 rack mount kit screw holes)

1.2.7 Internal View

The TDM series industrial monitor AD board provides a wide variety of control interfaces, receiving and managing signals from a CPU card through cabling. Refer to **Section 3.3** for a complete description of the AV-6600 AD board and its connectors.

1.3 Series Specifications

Table 1-2 shows the TDM Series specifications.

Model	TDM-121GMS	TDM-150GMS
LCD Size	12.1”	15”
Input Interface	Analog VGA+DVI-D	Analog VGA+DVI-D
Resolution	1024 x 768	1024 x 768
Brightness	500 cd/m^2	350 cd/m^2
Contrast	700:1	700:1
Display Color	262,144	262,144

Model	TDM-121GMS	TDM-150GMS
View Angle	160/160	140/125
Front Frame	Aluminum	
Chassis	Heavy-duty steel	
Input Voltage	9~36VDC	
OSD Function	Yes	
Mounting	Wall / Panel / Rack / Arm / Stand	
Color	Silver	
Dimension (mm)	340 x 260 x 58	410 x 309x 65.2
Operation Temperature	-30°C~70°C	
Storage Temperature	-40°C~80°C	
IP Level	IP 65	
Net Weight	3.3kg	6kg

Table 1-2: TDM Series Specifications

1.4 Certifications

All TDM series industrial monitor models comply with the following international standards:

- RoHS
- IP 65

For a more detailed description of these standards, please refer to **Sections A.1** and **A.2**.

Chapter

2

Detailed Specifications

2.1 Introduction

This chapter describes the general mechanical overview of the TDM series monitors including front and rear panel, available interfaces and overall dimensions.

2.2 Front Panel

The front panel of the TDM series industrial monitor is comprised of a TFT LCD with LED backlight in an aluminum frame with an OSD control panel. **Figure 2-1** shows the front panel of the TDM series.

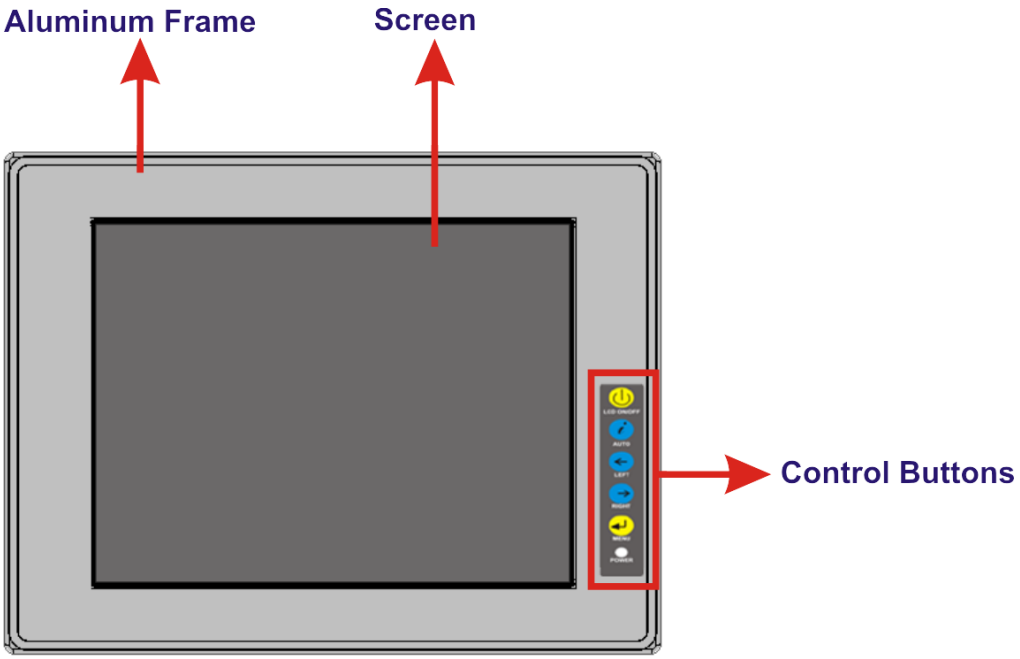

Figure 2-1: Front Panel

2.3 Rear Panel

All peripheral device connectors are located on the rear panel of the TDM series industrial monitor. The following rear panel connectors may be found on the TDM series. **Figure 2-2** shows the location of the connectors.

- 12V power connector
- 9V ~ 36V terminal block
- DVI-D connector
- Touch screen with RS-232 interface
- Touch screen with USB interface
- VGA connector

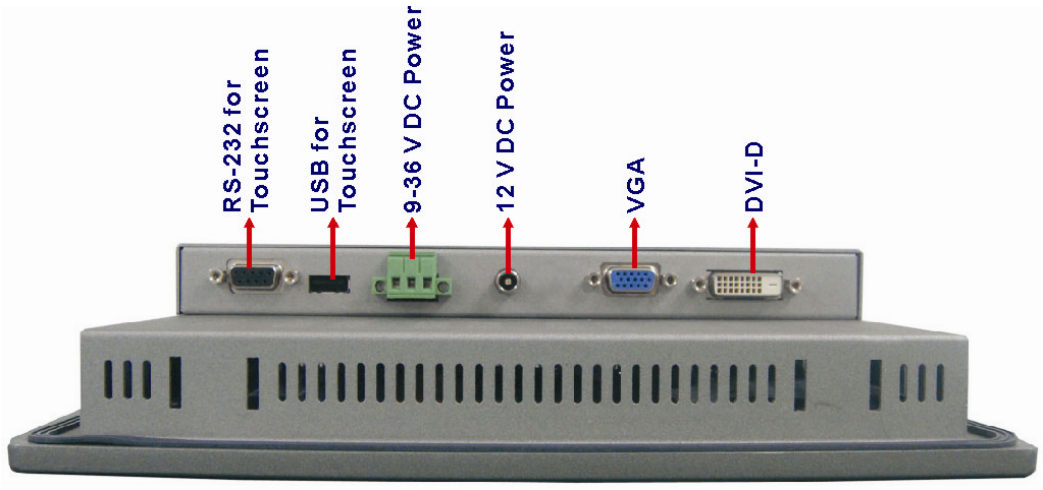

Figure 2-2: TDM Series Rear Panel Connector Locations

2.4 Physical Dimensions

The following sections describe the physical dimensions for each model of the TDM series industrial monitor.

2.4.1 General Physical Dimensions

General physical dimensions for the TDM series industrial monitors are shown in **Table 2-1**.

Model	Width (mm)	Height (mm)	Depth (mm)
TDM-121GMS	340	260	58
TDM-150GMS	410	309	65.2

Table 2-1: General Physical Dimensions

2.4.2 TDM-121GMS Physical Dimensions

The physical dimensions of the TDM121GMS are shown in **Figure 2-3**.

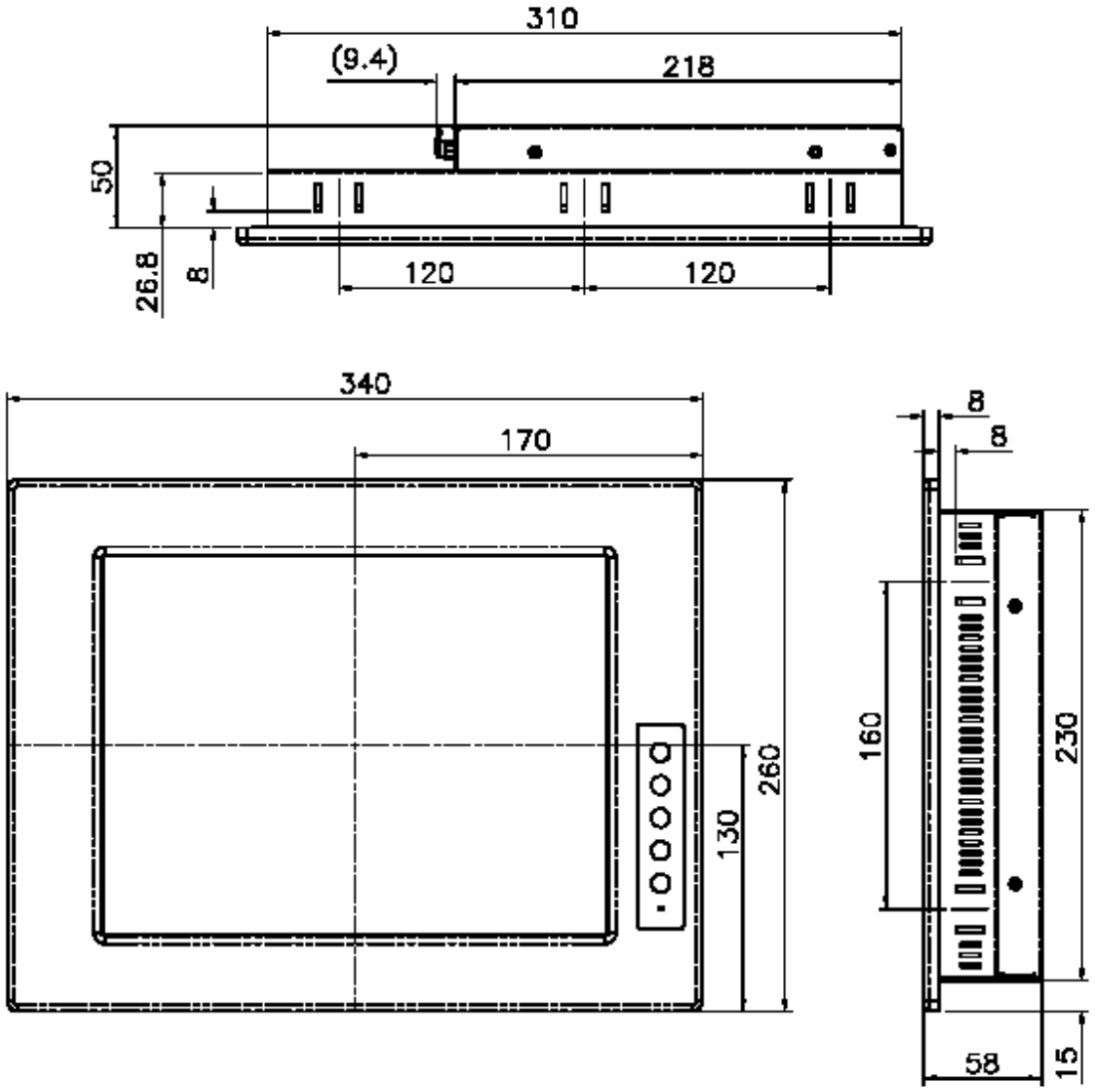

Figure 2-3: TDM-121GMS Physical Dimensions (millimeters)

2.4.3 TDM-150GMS Physical Dimensions

The physical dimensions of the TDM-150GMS are shown in **Figure 2-4**.

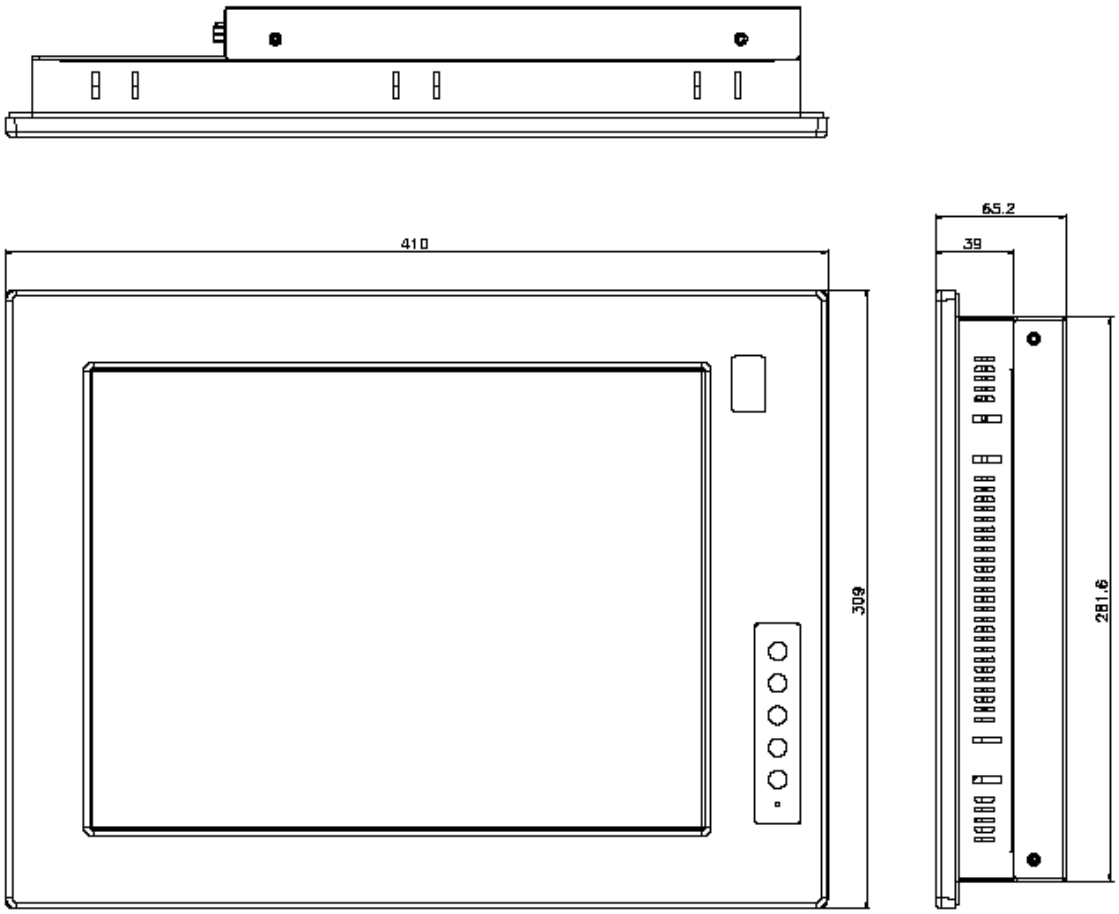

Figure 2-4: TDM-150GMS Physical Dimensions (millimeters)

2.5 Mounting Kits

The following sections describe the various optional mounting kits available for each model of the TDM series industrial monitor. Refer to **Section 4.4.7** for detailed instructions on the different mounting methods for the monitors.

Table 2-2 lists the mounting kits available for the TDM series monitor.

Model	TDM-121GMS	TDM-150GMS
Panel Mounting Kit	PK-121M	PK-150M
Wall Mounting Kit	WK-121MS-R10	WK-150MS-R10
Rack Mounting Kit	RK-121MS-R10	RK-150MS-R10
LCD Monitor Arm	ARM-11	ARM-31
LCD Monitor Stand	STAND-100-RS	STAND-200-RS

Table 2-2: TDM Series Mounting Kits

2.6 Mounting Options

Each TDM series industrial monitor has a number of mounting holes or slots located on the back side of the aluminum frame or on the rear panel for mounting the monitor to a rack, panel, cabinet, rail, wall, arm or stand. The following sections describe the various mounting methods or each model of the TDM series industrial monitor.

2.6.1 Panel Mounting

Each model of the TDM series industrial monitor has a series of mounting slots located on the top and bottom panel for mounting the monitor to a panel.

Table 2-3 lists the number of mounting clamps required to mount the monitor to a panel.

Model	Mounting Clamps
TDM-121GMS	10
TDM-150GMS	10

Table 2-3: Panel Mounting Clamps

2.6.2 Rack and Cabinet Mounting

Each model of the TDM series industrial monitor has a series of holes located on the rear of the front panel for securing the monitor to the rack mounting kit.

Table 2-4 lists the number of holes each monitor has to secure the monitor to the rack mounting kit.

Model	Holes
TDM-121GMS	4
TDM-150GMS	6

Table 2-4: Rack Mounting Holes

2.6.3 Wall Mounting

Each model of the TDM series industrial monitor has four holes located on the rear panel for mounting the monitor to a wall.

2.6.4 Monitor Arm or Stand Mounting

The TDM series industrial monitor has four Video Electronics Standards Association (VESA) standard holes located on the rear panel for mounting the monitor to a monitor arm or stand.

NOTE:

The monitor stand is purchased separately.

Chapter

3

LCD and Touch Screen Specifications

3.1 LCD Specifications

3.1.1 LCD Overview

The TDM series industrial monitors use the following LCD panels.

- **TDM-121GMS**: AUO G121XN01 V0
- **TDM-150GMS**: AUO G150XG01 V1

Detailed specifications for the LCD screens are listed in the following sections.

3.1.2 TDM-121GMS LCD Specifications

Table 3-1 lists the LCD specifications of the TDM-121GMS.

Model	TDM-121GMS
Size	12.1”
MFR/Model	AUO/G121XN01 V0
Resolution	XGA (1024 x 768)
Active Area (mm)	245.76 x 184.32
Pixel Pitch (mm)	0.3075
Mode	TN
Number of Colors	262K
View Angle (H/V)	160/160
Brightness (cd/m2)	500
Contrast Ratio	700:1
Response Time (ms) (at 25C)	35
Power Consumption (W)	9.15
Interface	1ch LVDS
Supply Voltage (V)	3.3
Backlight	LED
Color Saturation (NTSC%)	70

Table 3-1: TDM-121GMS LCD Specifications

3.1.3 TDM-150GMS LCD Specifications

Table 3-2 lists the LCD specifications of the TDM-150GMS.

Model	TDM-121GMS
Size	15”
MFR/Model	AUO/G150XG01 V1
Resolution	XGA (1024 x 768)
Active Area (mm)	304.1 x 228.1
Pixel Pitch (mm)	0.297
Mode	TN
Number of Colors	16.2M
Color Saturation (NTSC%)	65
View Angle (H/V)	140/120
Brightness (cd/m2)	350
Contrast Ratio	700:1
Response Time (ms) (at 25C)	8
Power Consumption (W)	8.9
Interface	1ch LVDS
Supply Voltage (V)	3.3
Backlight	2 CCFL
Lamp Life (hrs)	50000

Table 3-2: TDM-150GMS LCD Specifications

3.2 Touch Screens

The TDM series industrial monitors all preinstalled with touch screens with the following features:

- 8-wire touch screen
- Small border customized design
- All size touch screen design
- Customized activation force and palm rejection
- Customized optical characteristics
- High reliability and durability in the field

3.3 AV-6600 AD Board Overview

The TDM series industrial monitor AD board provides a wide variety of control interfaces, receiving and managing interface signals from a CPU card through cabling. The following sections describe the AV-6600 AD board in detail.

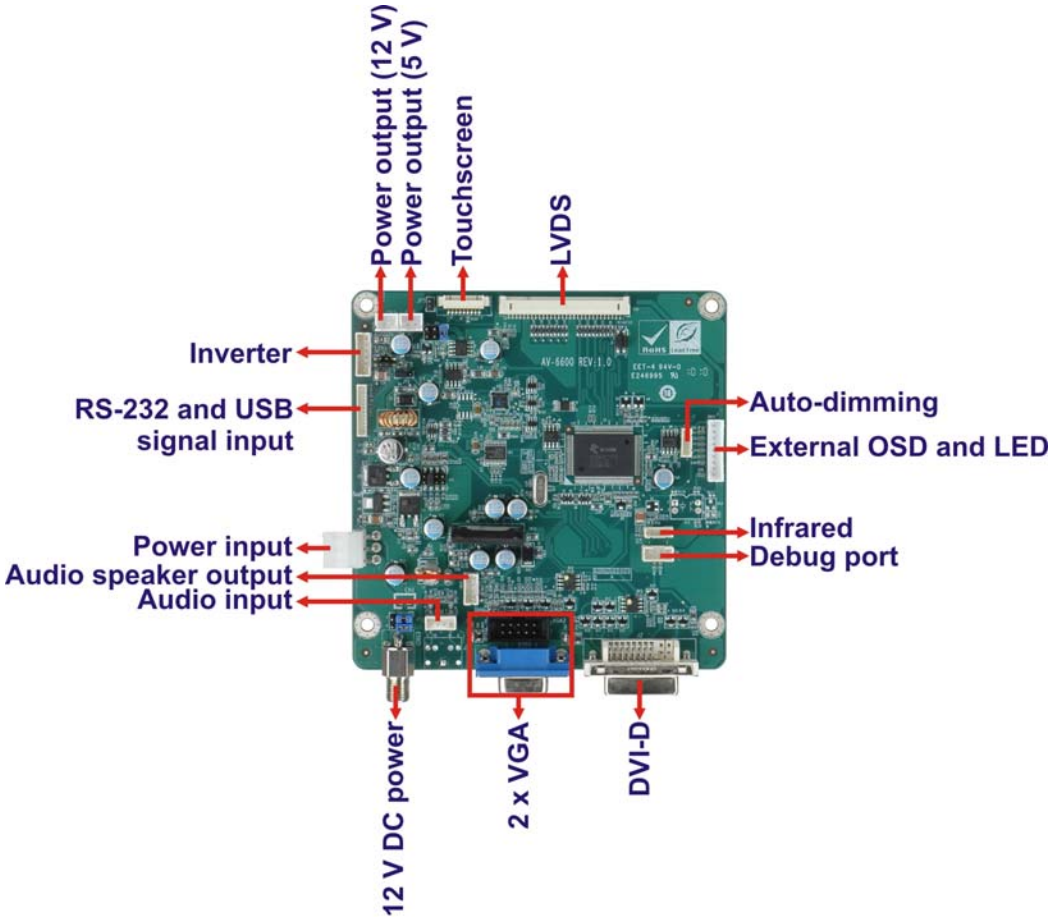

Figure 3-1: AV-6600 AD Board Overview

3.3.1 AV-6600 Peripheral Interface Connectors

Table 3-3 shows a list of the peripheral interface connectors on the AV-6600 AD board.

Connector	Type	Label
Audio input connector	4-pin wafer connector	CN11
Audio speaker output connector	4-pin wafer connector	CN12
Auto-dimming connector	6-pin wafer connector	CN7
Debug connector	4-pin wafer connector	CN9
External OSD and LED indication connector	9-pin wafer connector	CN10

Infrared connector	6-pin wafer connector	CN8
Inverter interface connector	6-pin wafer connector	CN6
LVDS connector	30-pin connector	CN5
Power output connector (+12 V)	2-pin wafer connector	CN3
Power output connector (+5 V)	2-pin wafer connector	CN4
Power input connector	3-pin connector	CN2
RS-232 and USB signal input connector	12-pin wafer connector	CN14
Touchscreen connector	9-pin wafer connector	J4
VGA connector	10-pin box header	VGA2

Table 3-3: AV-6600 Peripheral Interface Connectors

3.3.2 AV-6600 Rear Panel Connectors

Table 3-4 lists the rear panel connectors on the AV-6600 AD board.

Connector	Type	Label
12V DC power connector	DC Power Jack	CN13
DVI connector	24-pin DVI-D connector	J2
VGA connector	15-pin VGA connector	VGA1

Table 3-4: AV-6600 Rear Panel Connectors

Chapter

4

Installation

4.1 Installation Precautions

When installing the TDM series industrial monitor, please follow the precautions listed below:

- **Read the user manual**: The user manual provides a complete description of the TDM series industrial monitor, installation instructions and configuration options.
- **DANGER! Disconnect Power**: Power to the monitor must be disconnected when installing the TDM series industrial monitor, or before any attempt is made to access the rear panel. Electric shock and personal injury might occur if the rear panel of the monitor is opened while the power cord is still connected to an electrical outlet.
- **Qualified Personnel**: The TDM series industrial monitor must be installed and operated only by trained and qualified personnel. Maintenance, upgrades, or repairs may only be carried out by qualified personnel who are familiar with the associated dangers.
- **Mounting**: Since the monitor may weigh up to 10 kg (not including a swing arm or other accessories), please ensure at least two people assist with mounting the monitor.
- **Air Circulation**: Make sure there is sufficient air circulation when installing the monitor. The monitor's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the monitor. Leave at least 5 cm of clearance around the monitor to prevent overheating.
- **Grounding**: The monitor should be properly grounded. The voltage feeds must not be overloaded. Adjust the cabling and provide external overcharge protection per the electrical values indicated on the label attached to the back of the monitor.
- **Anti-static Discharge**: The rear panel of the monitor must to be removed to configure the monitor's AD board voltage select jumper. When doing so, be sure the monitor is disconnected from its power source and take all necessary safety precautions to avoid electrocution and static discharge to the AD board. The use of a grounded wrist strap and an anti-static work pad is recommended.

4.2 Unpacking

4.2.1 Packaging

When shipped, the TDM series industrial monitor is wrapped in a plastic bag. Two polystyrene ends are placed on either side of the monitor. The monitor is then placed into a first (internal) cardboard box. This box is then sealed and placed into a second (external) cardboard box. The second box is also sealed. A bag containing accessory items is placed underneath the monitor, at the bottom of the internal (first) box.

4.2.2 Unpacking Procedure

To unpack the TDM series industrial monitor, follow the steps below:

WARNING:

The front side LCD screen has a protective plastic cover stuck to the screen. Only remove the plastic cover after the TDM series industrial monitor has been properly installed. This ensures the screen is protected during the installation process.

Step 1: Use box cutters, a knife or a sharp pair of scissors to open the seal on the top side of the external (second) box.

Step 2: Open the external (second) box.

Step 3: Use box cutters, a knife or a sharp pair of scissors the seal on the top side of the internal (first) box.

Step 4: Lift the monitor out of the boxes.

Step 5: Remove both polystyrene ends, one from each side.

Step 6: Pull the plastic cover off the TDM series industrial monitor.

Step 7: Make sure all the components listed in the packing list are present.

4.2.3 Packing List

All the monitors in the TDM series are shipped with the following components:

- TDM-121GMS / TDM-121GMS/T-R / TDM-150GMS / TDM-150GMS/T-R industrial LCD monitor
- 1 x Power cable for terminal block
- 1 x VGA cable
- 1 x Screw set
- 1 x User manual on CD-ROM
- 1 x Touch screen RS-232 cable / touch pen / driver CD-ROM (T-R models only)
- *1 x 45W AC power adapter with AC 90V ~ 264V @ 1A input and DC +12V @3.75A output / AC power cord
- * External 45W power adapter only supports 0°C ~ 40°C operating temperature
- If any of these items are missing or damaged, contact the distributor or sales representative immediately.

4.3 Pre-installation Preparation

4.3.1 Tools

Before installing the TDM series industrial monitor, make sure the following tools are on hand:

- **Phillips (crosshead) screwdriver**: All the retention screws on the system are Phillips screws.
- **Soft working mat**: When the TDM series industrial monitor is installed, the screen is placed on the working surface. It is therefore important to rest the MPC industrial workstation on a soft at that cannot damage the LCD screen on the front of the TDM series industrial monitor.

4.3.2 Voltage Select Jumper Settings

If the monitor comes with both 12V and 9 ~ 36V DC power connectors, the voltage select jumper on the integrated AD board must be configured for the DC connector that is used to power the monitor. Refer to **Section 4.3.2** for the appropriate jumper settings of the AD board.

NOTE:

The default voltage select jumper is configured for a 12V power source.

Do not change the jumper setting unless a 9~36V DC power connector is to be used as the monitor's power source.

To properly set the voltage select jumper, the following steps must be completed:

Step 1: Use a screwdriver to remove all the screws holding the rear panel to the monitor.

Step 2: Remove the rear panel.

Step 3: Locate the voltage select jumper. (See **Section 4.3**)

Step 4: Use the jumper(s) to set the correct voltage input. (See **Section 4.3.2**)

Step 5: Replace the rear panel.

Step 6: Replace all removed screws.

4.4 Connectors

Table 4-1 lists the external peripheral interface panel connectors for the TDM series industrial monitors.

	TDM-121GMS	TDM-150GMS
VGA	Yes	Yes
DVI-D	Yes	Yes
Power (12V Jack)	Yes	Yes
Power (9 ~ 36V)	Yes	Yes
RS-232 Touch Screen	Yes	Yes
USB Touch Panel	Yes	Yes

Table 4-1: External Peripheral Interface Connectors

4.4.1 Rear Panel Connectors Overview

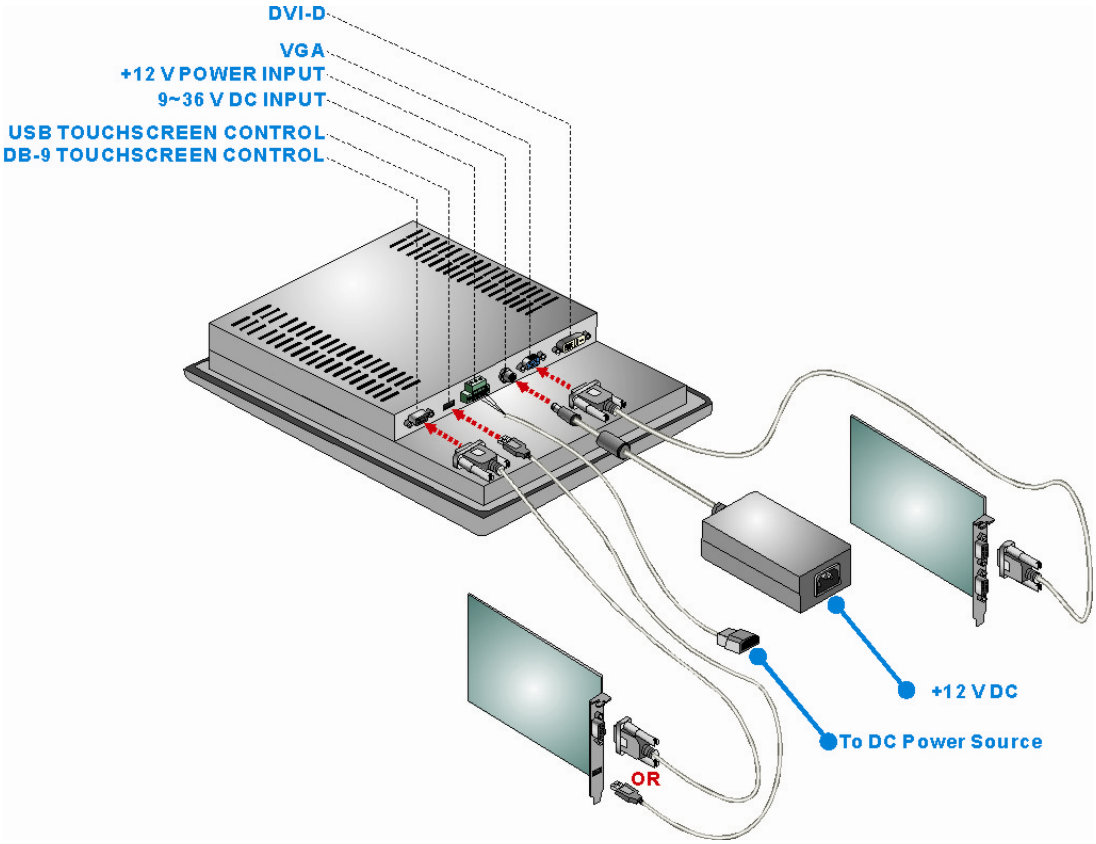

Figure 4-1: Monitor Rear Panel Connections

Figure 4-1 shows all the possible rear panel connectors for the TDM series LCD monitor. The following sections fully describe the rear panel connectors for the TDM series LCD monitor.

4.4.2 VGA Connector

Use the rear panel standard 15-pin female VGA connector to connect the monitor to the system graphics interface. See **Section 4.2.8** for the VGA connector location and pinouts.

4.4.3 DVI-D Connector

Use the rear panel standard 24-pin female DVI-D connector to connect the monitor to the system graphics interface. See **Section 4.4.3** for the DVI-D connector location and pinouts.

4.4.4 12V Power Connector

Use the rear panel +12V DC jack to connect the monitor to a power source.

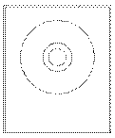

Figure 4-2: 12V Power Connector

4.4.5 DC Power Connector

Use the rear panel 3-pin terminal block DC power connector to connect the monitor to a DC power source.

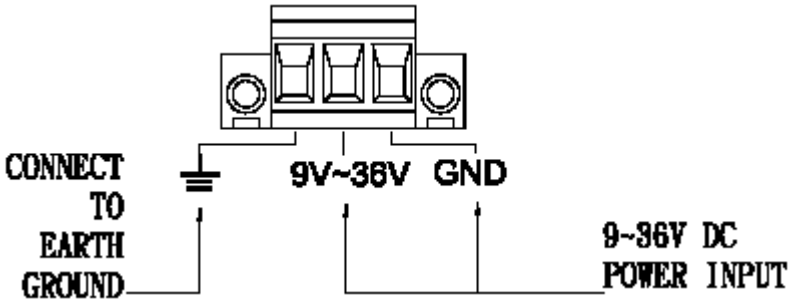

Figure 4-3: DC Power Connector

4.4.6 RS-232 Touch Screen Connector

Use the rear panel standard RS-232 DB-9 female touch screen connector to connect the monitor to the system graphics interface.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD1	6	CTS1
2	DSR1	7	DTR1
3	RX1	8	RI1
4	RTS1	9	GND
5	TX1		

Table 4-2: RS-232 Touch Screen Connector Pinouts

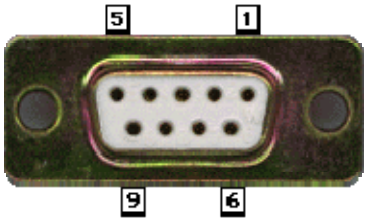

Figure 4-4: RS-232 Touch Screen Connector

4.4.7 USB Touch Panel Connector

Use the rear panel standard USB touch panel connector to connect the monitor to the system graphics interface.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	5	VCC
2	Data-	6	Data-
3	Data+	7	Data+
4	GND	8	GND

Table 4-3: USB Touch Screen Connector Pinouts

Figure 4-5: USB Touch Screen Connector

4.5 Mounting the TDM Series LCD Monitor

The TDM series LCD monitor can be mounted in a panel, cabinet, rack, or wall. The monitor can also be mounted on a monitor arm or stand. The mounting methods are described below.

CAUTION:

When mounting the monitor take care to tighten the retention screws or bolts until fully secure, but do not over tighten. Over tightening the retention screws or bolts may cause them to become stripped, rendering them useless.

4.5.1 Panel Mounting

To mount the TDM series LCD monitor into a panel, please follow the steps below.

Step 1: Select the position on the panel to mount the monitor.

Step 2: Cut out a section of the panel that corresponds to the rear panel dimensions of the monitor. Take care that the panel section that is cut out is smaller than the overall size of the metal frame that surrounds the monitor but just large enough for the rear panel of the monitor to fit through (**Figure 4-6**).

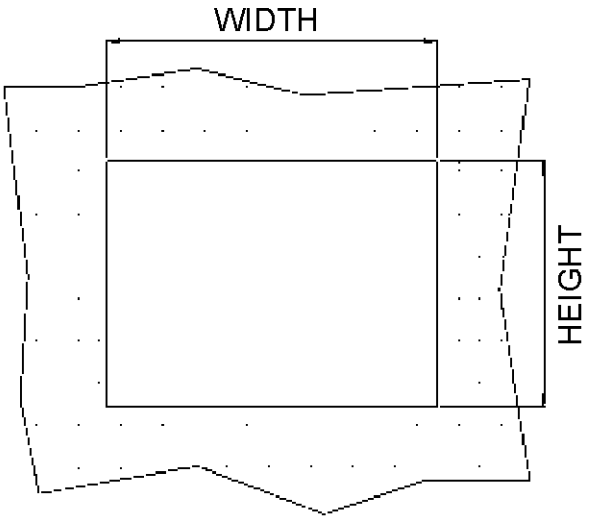

Figure 4-6: Panel Opening

Step 3: Slide the monitor through the hole until the metal frame is flushed against the panel (**Figure 4-7**).

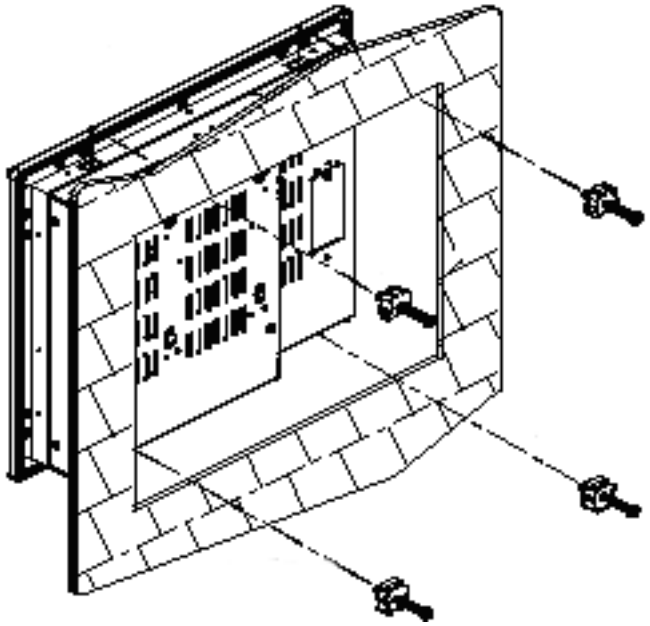

Figure 4-7: Insert the Monitor

Step 4: Insert the panel mounting clamps into the pre-formed holes along the edges of the monitor, behind the metal frame. **Figure 4-8** shows the location of clamp insertion holes on one side of the LCD monitor. Refer to **Table 2-3** for the mounting clamps required for each model.

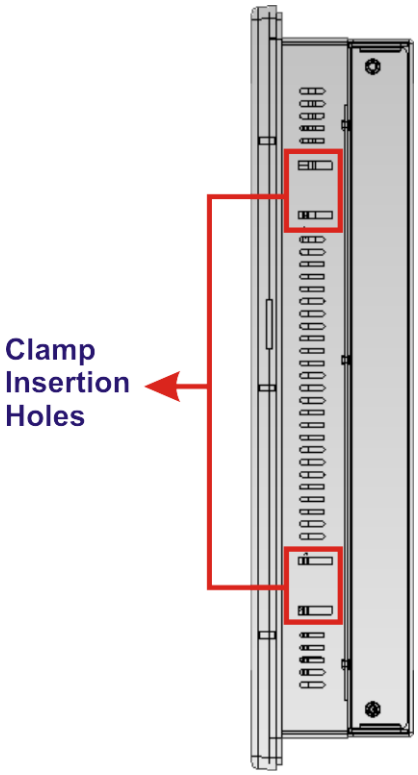

Figure 4-8: Clamp Insertion Holes

Step 5: Tighten the screws that pass through the panel mounting clamps until the plastic caps at the front of all the screws are firmly secured to the panel (**Figure 4-9**).

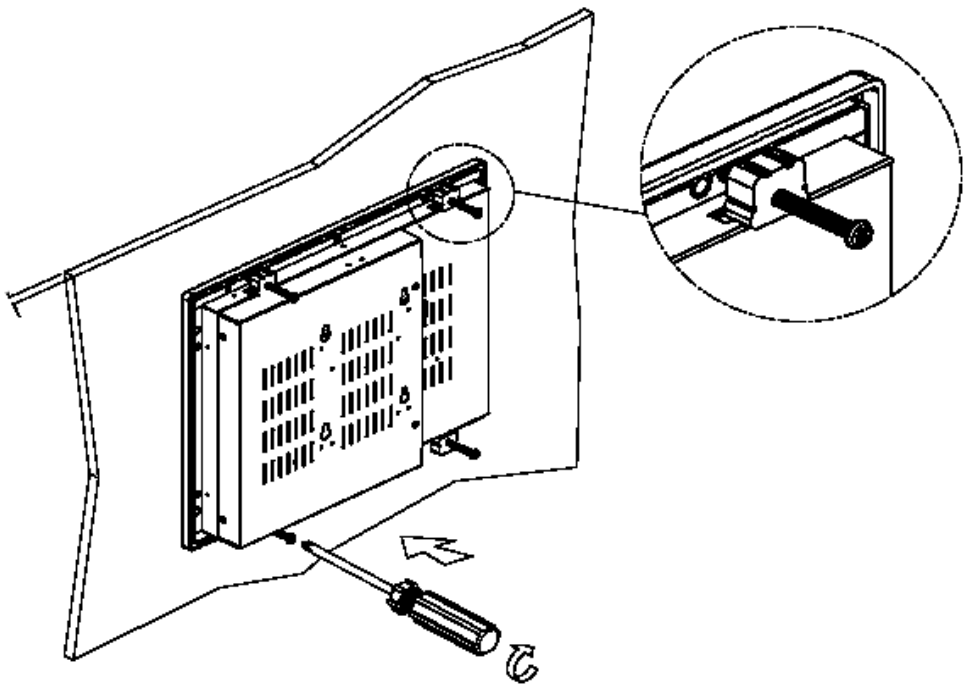

Figure 4-9: Panel Mounting Clamp Position

4.5.2 Cabinet and Rack Installation

The TDM series provides optional rack mount kits for industrial racks. To mount the TDM series LCD monitor into a cabinet/rack, please follow the steps below.

Step 1: The back of the metal frame surrounding the TDM series LCD monitor has several retention screw holes for a rack mount kit. See **Figure 1-6** and **Figure 1-7**.

Step 2: Slide the monitor through the rack mount kit until the rear side of the monitor frame is flushed against the front of the rack mount kit.

Step 3: Make sure the retention screw holes at the rear of the monitor frame are aligned with the retention screw holes in the rack mount kit.

Step 4: Secure the rack mount kit to the monitor by inserting and tightening the retention screws (**Figure 4-10**).

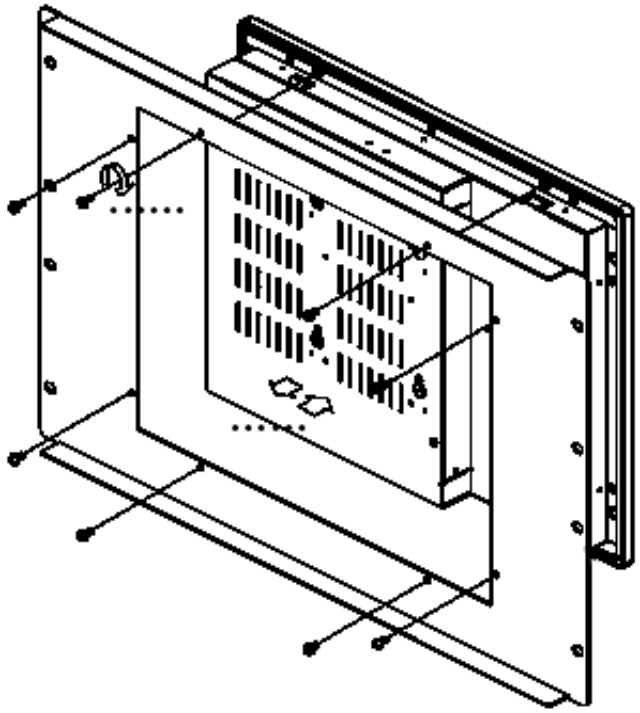

Figure 4-10: Secure the Rack Mount Kit

Step 5: Slide the monitor with the attached rack mount kit into a rack or cabinet (**Figure 4-11**).

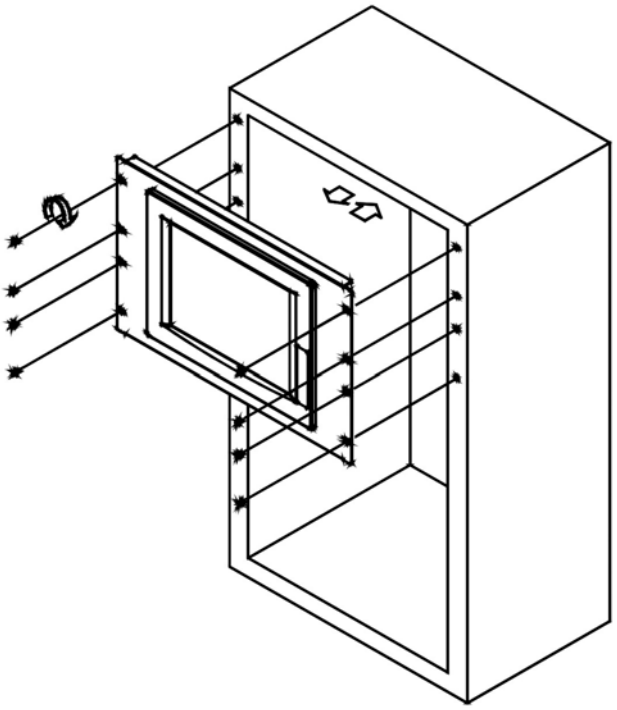

Figure 4-11: Install into a Cabinet/Rack

Step 6: Once the monitor with the attached cabinet/rack has been properly inserted into the rack or cabinet, secure the front of the rack/cabinet bracket to the front of the rack or cabinet (**Figure 4-11**).

4.5.3 Wall Mounting

To mount the TDM series industrial monitor onto a wall, please follow the steps below.

Step 1: Select a location on the wall for the wall-mounting bracket.

Step 2: Carefully mark the locations of the four bracket screw holes on the wall.

Step 3: Drill four pilot holes at the marked locations on the wall for the bracket retention screws.

Step 4: Align the wall-mounting bracket screw holes with the pilot holes.

Step 5: Secure the mounting-bracket to the wall by inserting the retention screws into the four pilot holes and tightening them (**Figure 4-12**).

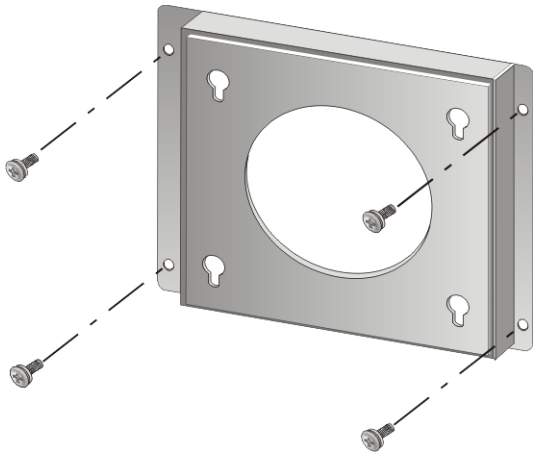

Figure 4-12: Wall-mounting Bracket

Step 6: Insert the four monitor mounting screws provided in the wall mounting kit into the four screw holes on the real panel of the monitor and tighten until the screw shank is secured against the rear panel (**Figure 4-13**).

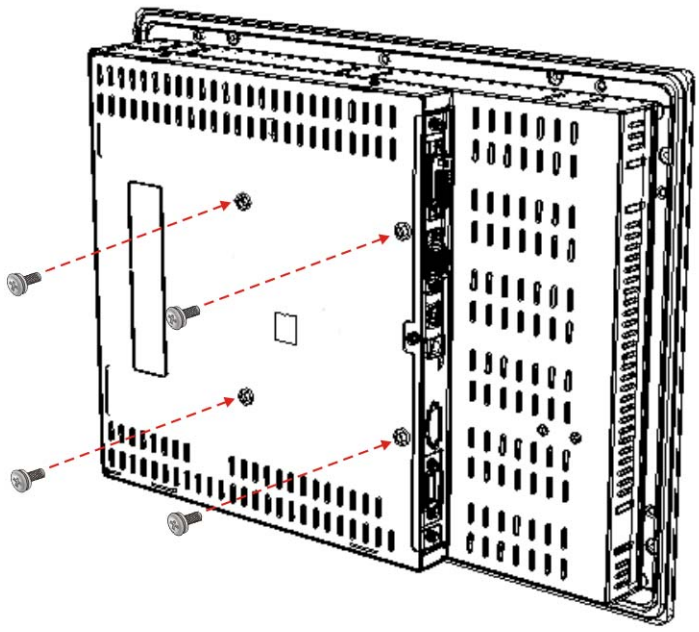

Figure 4-13: Monitor Support Screws

Step 7: Align the mounting screws on the monitor rear panel with the mounting holes on the bracket.

Step 8: Carefully insert the screws through the holes and gently pull the monitor downwards until the monitor rests securely in the slotted holes (**Figure 4-14**). Ensure that all four of the mounting screws fit snuggly into their respective slotted holes.

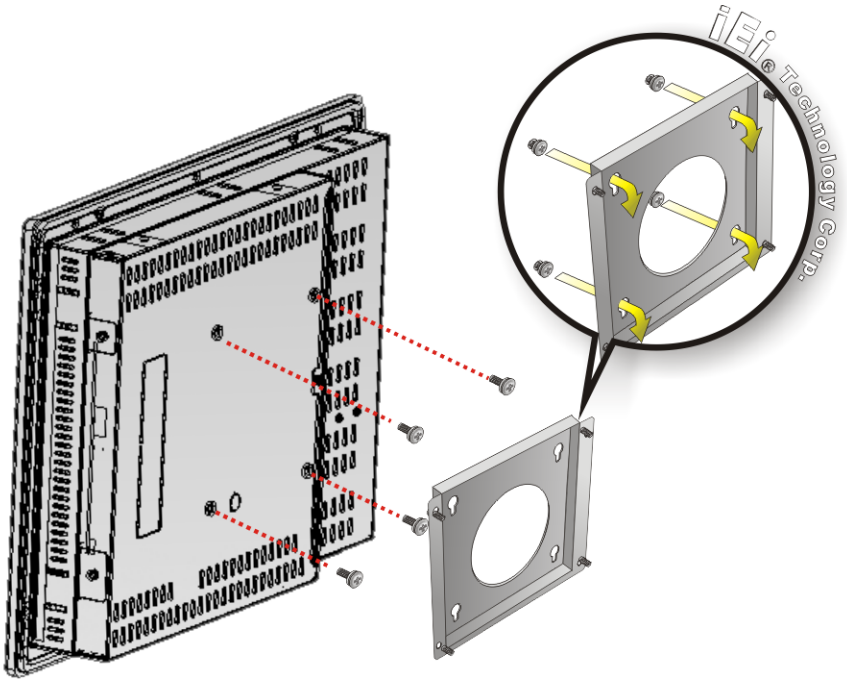

Figure 4-14: Wall Mounting the Monitor

4.5.4 Monitor Stand Installation

The TDM series industrial monitor has Video Electronics Standards Association (VESA) standard mounting holes tapped into the rear panel. The standard holes are M4 set at 100m x 100mm apart (**Figure 4-15**).

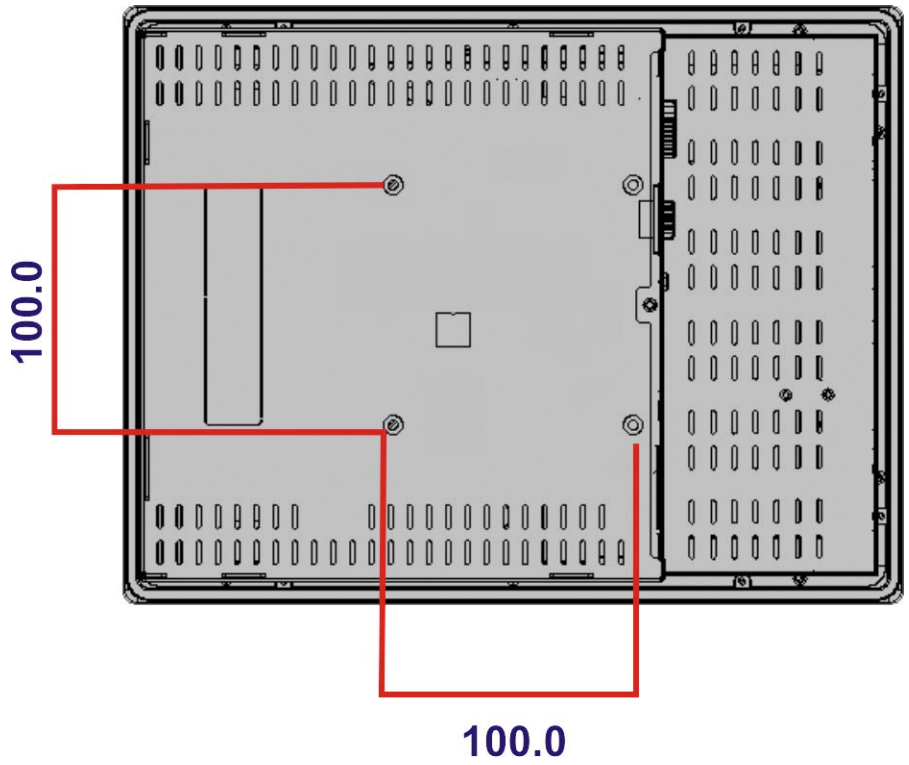

Figure 4-15: VESA Mounting Holes

The monitor stand mounting plate has a matching VESA hole pattern. To mount the TDM series industrial monitor onto a stand, please follow the steps below.

Step 1: Line up the threaded holes on the monitor rear panel with the screw holes on the monitor stand mounting plate.

Step 2: Secure the monitor to the stand with the supplied retention screws (**Figure 4-16**).

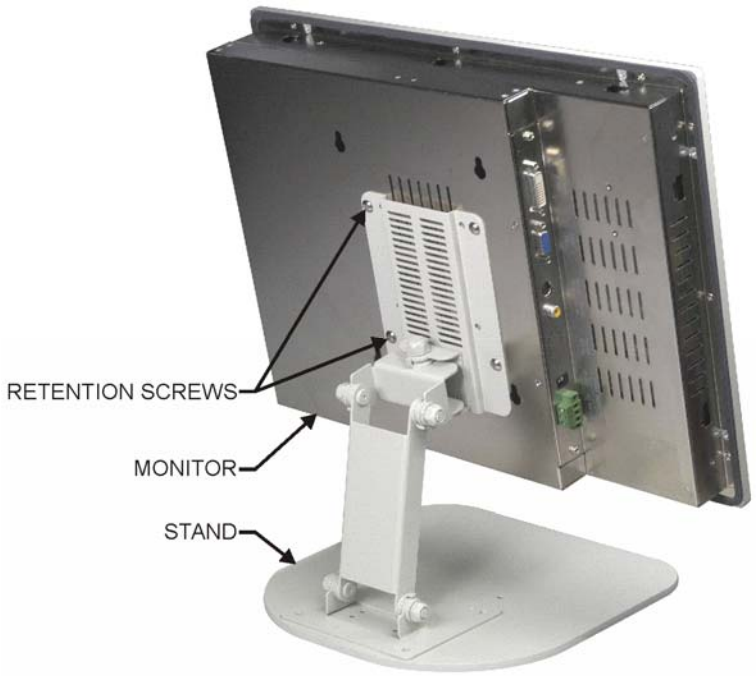

Figure 4-16: Monitor Stand Mounting

4.5.5 Monitor Arm Installation

The TDM series industrial monitor has Video Electronics Standards Association (VESA) standard mounting holes tapped into the rear panel. The standard holes are M4 set at 100m x 100mm apart (**Figure 4-15**). The monitor arm mounting plate has a matching VESA hole pattern. To mount the TDM series industrial monitor onto a monitor arm, please follow the steps below.

Step 1: Line up the threaded holes on the monitor rear panel with the screw holes on the monitor arm mounting plate.

Step 2: Secure the monitor to the arm with the supplied retention screws (**Figure 4-17**).

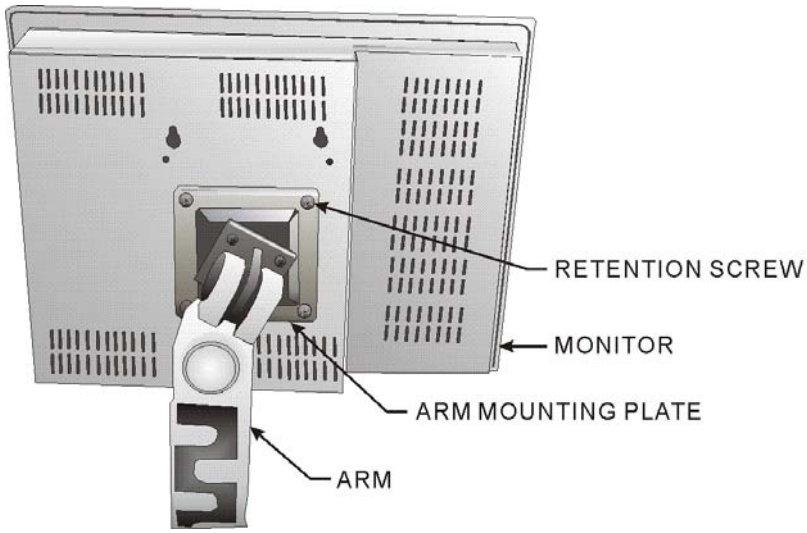

Figure 4-17: Monitor Arm Mounting

Chapter

5

On-Screen-Display (OSD) Controls

5.1 User Mode OSD Structure

5.1.1 OSD Buttons

There are several on-screen-display (OSD) control buttons oriented either vertically along the right hand side of the monitor front panel. **Figure 5-1** shows a typical arrangement of OSD controls.

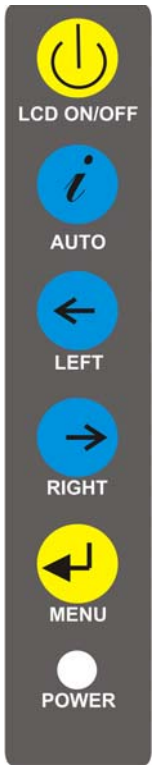

Figure 5-1: OSD Control Buttons for All Models

- **Menu/Enter Button**
  Press this button to open the OSD window. When inside a menu, press this button to confirm the function adjustment or selection of the item. There may be several levels in one item. As you select an item in the menu, the sub-items will be displayed.
- **Right Button**
  Press this button to scroll to the right, to decrease the value, or to switch from one selected item to another.

- **Left Button**

  Press this button to scroll to the left, to increase the value, or to switch from one selected item to another.

- **Auto/Exit Button**

  Press this button to enable auto-configuration or apply default values.

- **LCD ON/OFF Button**

  Press this button to turn the LCD monitor on or off.

5.1.2 OSD Menu Structure

Table 5-1 shows the OSD menu structure for all models of the TDM series LCD monitor.

Level 0	Level 1	Value
Main Display Features Menu	Brightness	0 to 100
	Contrast	0 to 100
	Clock	0 to 100
	Phase	0 to 100
	H. Position	0 to 100
	V. Position	0 to 100
	Sharpness	1 to 5
Color Menu	6500K	- Preset NTSC value
	7500K	- Preset NTSC value
	9300K	- Preset NTSC value
	Red	RGB values from 0 to 100
	Green	RGB values from 0 to 100
	Blue	RGB values from 0 to 100
OSD Menu	OSD Time Out	0 to 60 sec
	OSD Position	1 to 5
	OSD Transparency	20, 40, 60, 80, 100
	Factory Reset	Select
	Auto Adjust	Select
	Auto Color	Select
	Gamma	Off, On
Exit Menu	Exit	Select

Table 5-1: OSD Menus

5.2 Using the OSD

OSD menu options are described below.

5.2.1 Main Display Features

Main display features are shown in **Figure 5-2**.

Figure 5-2: Main Display Features

Brightness	The brightness option adjusts the brightness of screen. This function adjusts the offset value of ADC. Setting this value too high or too low will affect the quality of image. When the auto- dimming function is turned on, the brightness control is not effective.
Contrast	This function adjusts the gain value of ADC. Adjusting this value too high or too low will worsen the quality of image.
Clock	Adjusts the width of the display screen.
Phase	Adjusts the input signal.
H. Position	Adjusts the horizontal position of the display screen.
V. Position	Adjusts the vertical position of the display screen
Sharpness	Adjust the sharpness of the display

5.2.2 Color

Color options are shown in **Figure 5-3**.

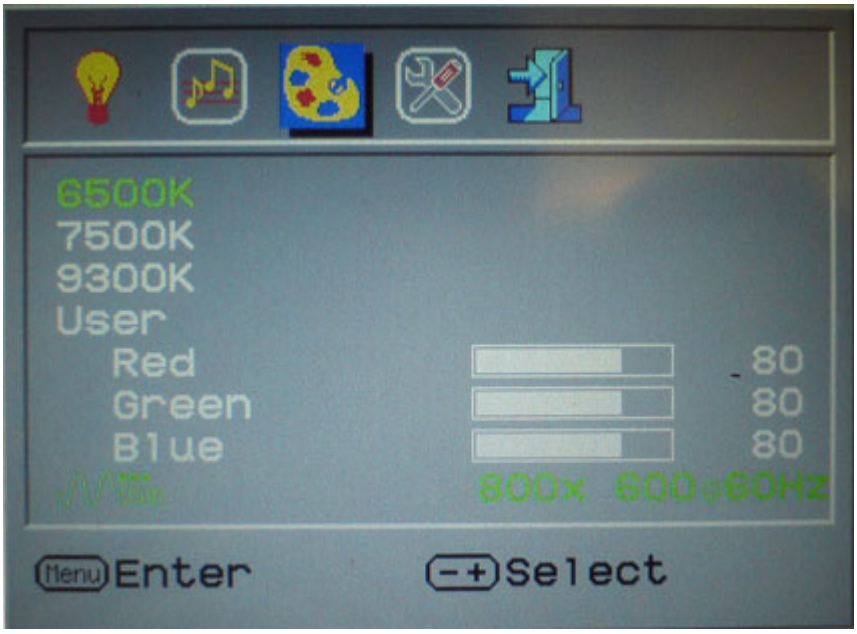

Figure 5-3: Color Options

The Color menu fine-tunes the palette of color hues for the LCD.

6500k	NTSC standard Kelvin
7500k	NTSC standard Kelvin
9300k	NTSC standard Kelvin
User	This item allows fine-tuning the balance among Red, Green, and Blue color hues if images look garish or unrealistic.

5.2.3 OSD Configurations

The OSD configurations are shown in **Figure 5-4**.

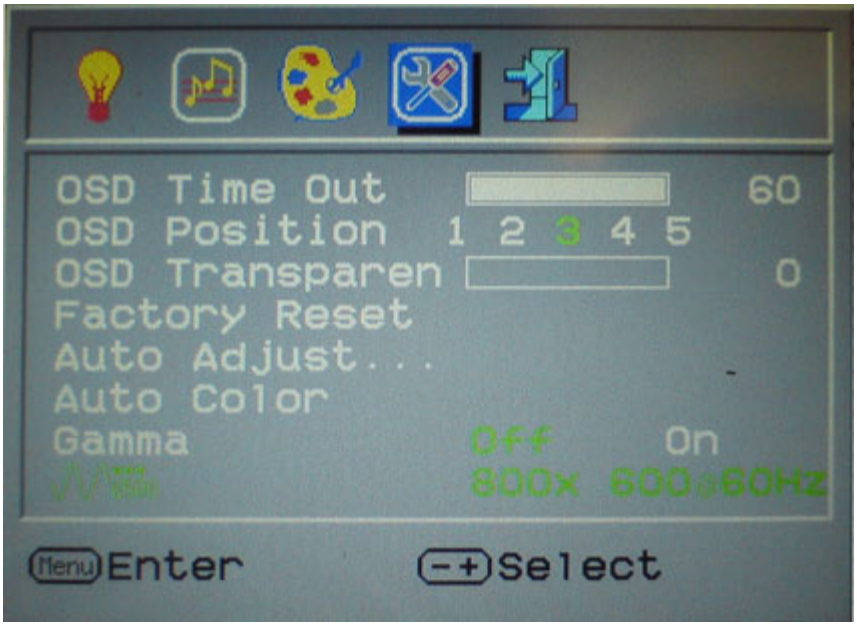

Figure 5-4: OSD Configurations Menu

OSD Configurations are described below.

OSD Time Out	Determines how many seconds the OSD screen stays on screen before it disappears when OSD is left unattended.
OSD Position	Adjusts the OSD position on the screen. Position 1 is in the upper left of the screen, position 2 in the upper right and position 3 in the center.
OSD Transparency	Adjust the transparency of the OSD menu background.
Factory Reset	Restores the default OSD settings. Note that this will restore all default display settings.
Auto Adjust	Automatically adjusts the position of the display screen
Auto Color	Automatically adjusts the color settings.

Chapter

6

Software Drivers

6.1 Introduction

The touch panel controller enables analog resistive touch panels for four-wire, five-wire & eight-wire models. The controller directly communicates with the PC system through the touch panel communications interface. The controller design is superior in sensitivity, accuracy, and friendly operation. The touch panel driver emulates the left mouse button and the right mouse button functions.

The touch panel driver supports the following operating systems:

- Microsoft® Windows® versions:
  - Microsoft® Windows® 2000
  - Microsoft® Windows® XP
  - Microsoft® Windows® 2003
  - Microsoft® Windows® 2008
  - Microsoft® Windows® Vista
  - Microsoft® Windows® 7
- Microsoft® Windows® CE versions:
  - Microsoft® Windows® CE 4.2
  - Microsoft® Windows® CE 5.0
  - Microsoft® Windows® CE 6.0
- Linux Kernel 2.6
- DOS

Driver installation is described below.

6.2 RS-232 or USB Touch Screen

Before installing the driver, connect the TDM Series monitor to the motherboard. The TDM Series monitors support touch screen modality through an RS-232 or USB interface connection. Decide through which interface the touch screen is to be controlled.

- **RS-232 Interface:** If the touch screen interface connection is an RS-232 connection, connect the RS-232 connector on the single board computer to the DB-9 connector of the TDM Series monitor.

- **USB Interface:** If the touch screen interface connection is a USB connection, connect the USB connector on the single board computer to the external USB port connector of the TDM Series monitor.

6.3 Touch Panel Driver Installation

WARNING:

Before the touch screen driver is installed, make sure the system is connected to the monitor with a USB cable or an RS-232 null cable. Also, make sure the VGA connector on the system is connected to the VGA connector on the bottom of the monitor.

To install the touch panel driver for the TDM Series, please follow the instructions below:

Step 1: **Connect the TDM Series monitor to the single board computer**. See above.

Step 2: **Install the driver CD**. Install the driver CD into the system to which the TDM Series monitor is connected.

Step 3: Select the **Touch Screen** option in the menu of driver CD. The directory in **Figure 6-1** appears.

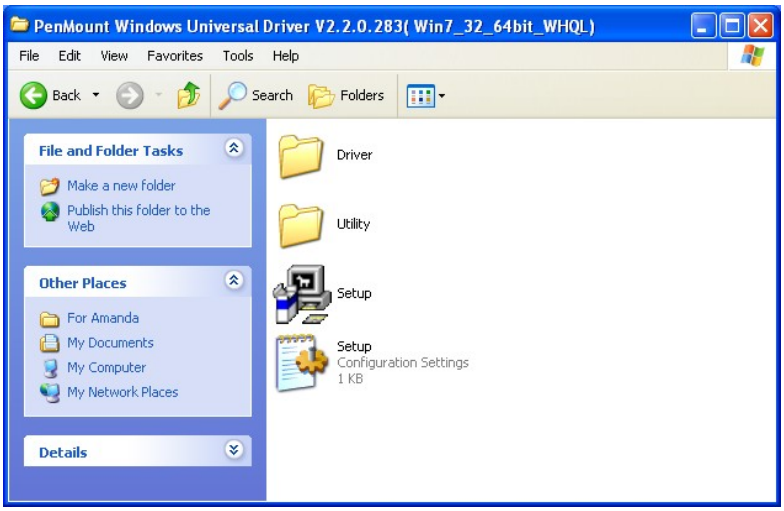

Figure 6-1: Setup Icon

Step 4: Double click the setup icon in **Figure 6-1**.

Step 5: The Welcome screen in **Figure 6-2** appears.

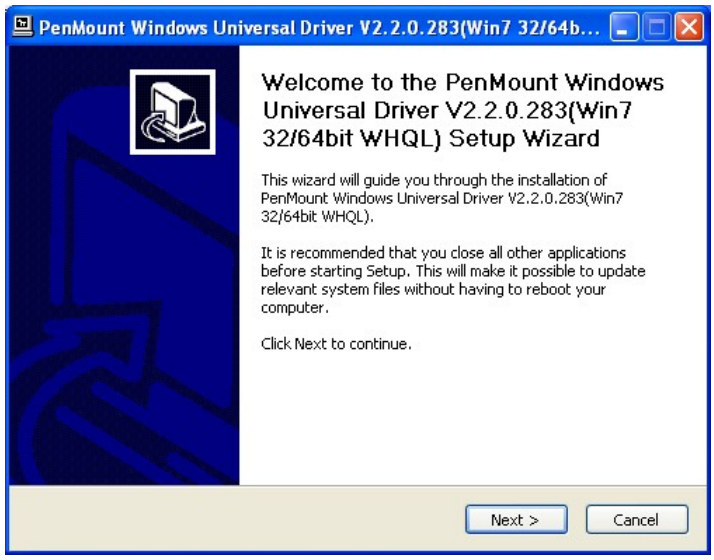
PenMount Windows Universal Driver V2.2.0.283(Win7 32/64b...
Welcome to the PenMount Windows Universal Driver V2.2.0.283(Win7 32/64bit WHQL) Setup Wizard
This wizard will guide you through the installation of PenMount Windows Universal Driver V2.2.0.283(Win7 32/64bit WHQL).
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

Figure 6-2: Welcome Screen

Step 6: Click **Next** to continue.

Step 7: The license agreement in **Figure 6-3** appears. Accept the terms of the agreement by clicking **I Agree**.

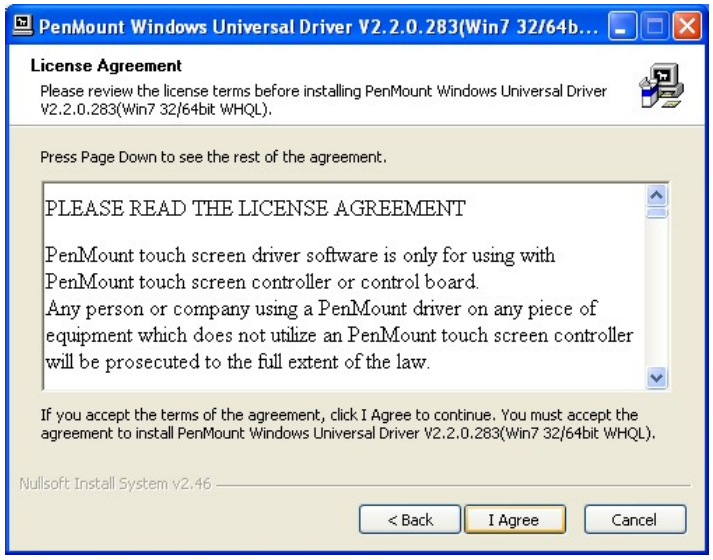
PenMount Windows Universal Driver V2.2.0.283(Win7 32/64b...
License Agreement
Please review the license terms before installing PenMount Windows Universal Driver V2.2.0.283(Win7 32/64bit WHQL).
Press Page Down to see the rest of the agreement.
PLEASE READ THE LICENSE AGREEMENT
PenMount touch screen driver software is only for using with PenMount touch screen controller or control board.
Any person or company using a PenMount driver on any piece of equipment which does not utilize an PenMount touch screen controller will be prosecuted to the full extent of the law.
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install PenMount Windows Universal Driver V2.2.0.283(Win7 32/64bit WHQL).
Nullsoft Install System v2.46
< Back
I Agree
Cancel

Figure 6-3: License Agreement

Step 8: The installation destination screen appears. See **Figure 6-4**. Click **Install**.

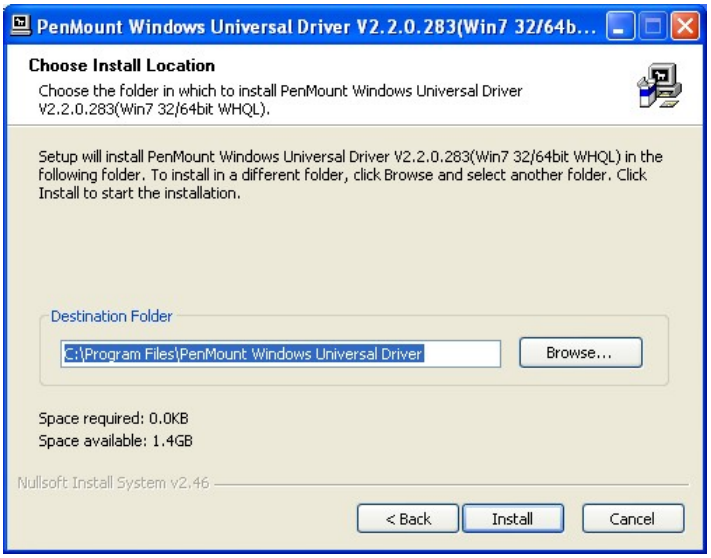
PenMount Windows Universal Driver V2.2.0.283(Win7 32/64b...
Choose Install Location
Choose the folder in which to install PenMount Windows Universal Driver V2.2.0.283(Win7 32/64bit WHQL).
Setup will install PenMount Windows Universal Driver V2.2.0.283(Win7 32/64bit WHQL) in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.
Destination Folder
C:\Program Files\PenMount Windows Universal Driver
Browse...
Space required: 0.0KB
Space available: 1.4GB
Nullsoft Install System v2.46
< Back
Install
Cancel

Figure 6-4: Initiate Install

Step 9: The installation of the program begins. See **Figure 6-5**.

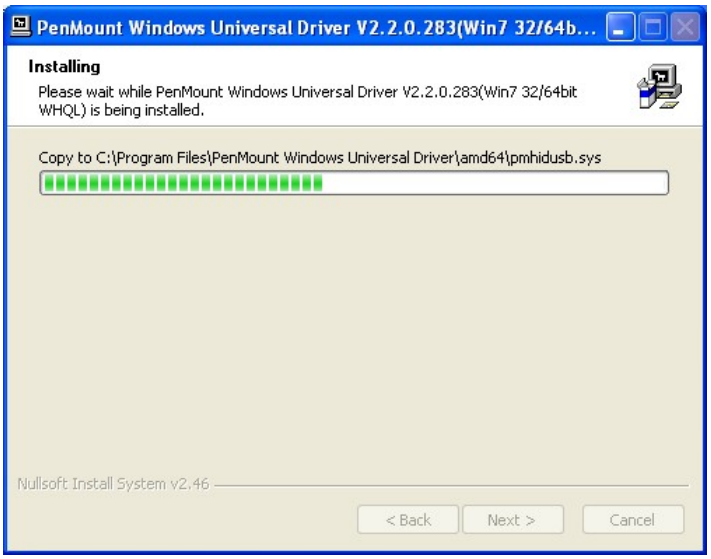
PenMount Windows Universal Driver V2.2.0.283(Win7 32/64b...
Installing
Please wait while PenMount Windows Universal Driver V2.2.0.283(Win7 32/64bit WHQL) is being installed.
Copy to C:\Program Files\PenMount Windows Universal Driver\amd64\pmhidusb.sys
Nullsoft Install System v2.46
< Back
Next >
Cancel

Figure 6-5: Installation Starts

Step 10: When the installation is complete, the complete screen appears. See **Figure 6-6**.

To complete the installation process click **Finish**.

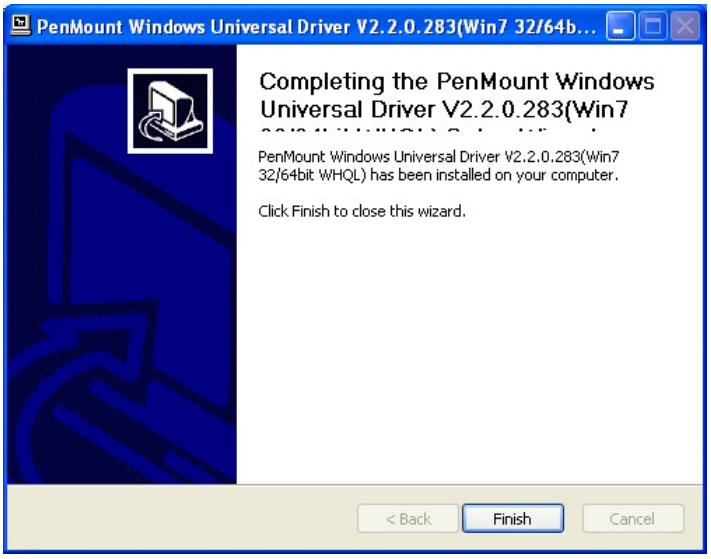
PenMount Windows Universal Driver V2.2.0.283(Win7 32/64b...
Completing the PenMount Windows Universal Driver V2.2.0.283(Win7
PenMount Windows Universal Driver V2.2.0.283(Win7 32/64bit WHQL) has been installed on your computer.
Click Finish to close this wizard.
< Back
Finish
Cancel

Figure 6-6: Finish Installation

6.4 Change the Touch Screen Interface

If the touch screen interface must be changed from an RS-232 interface to a USB interface or, from a USB interface to an RS-232 interface, the following steps must be followed.

Step 1: Uninstall the touch screen driver

Step 2: Remove the interface cable i.e. remove the RS-232 cable or the USB cable

Step 3: Install the new cable i.e. install the USB cable or the RS-232 cable.

Step 4: Reinstall the driver CD as described above.

6.5 Calibrating the Touch Screen

To calibrate the touch screen cursor with the motion of the touch screen pen (or finger), please follow the steps below:

Step 1: Make sure the system is properly connected through an RS-232 or a USB interface to the TDM Series monitor.

Step 2: Make sure the touch screen driver is properly installed.

Step 3: Locate the PenMount Monitor icon in the bottom left corner of the screen.

Figure 6-7: PenMount Monitor Icon

Step 4: Click the icon. A pop up menu appears. See **Figure 6-8**.

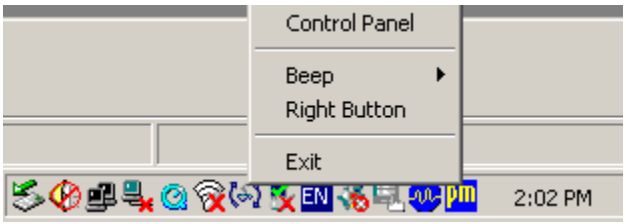

Figure 6-8: PenMount Monitor Popup Menu

Step 5: Click Control Panel in the pop up menu shown in **Figure 6-8.**

Step 6: The configuration screen in **Figure 6-9** appears.

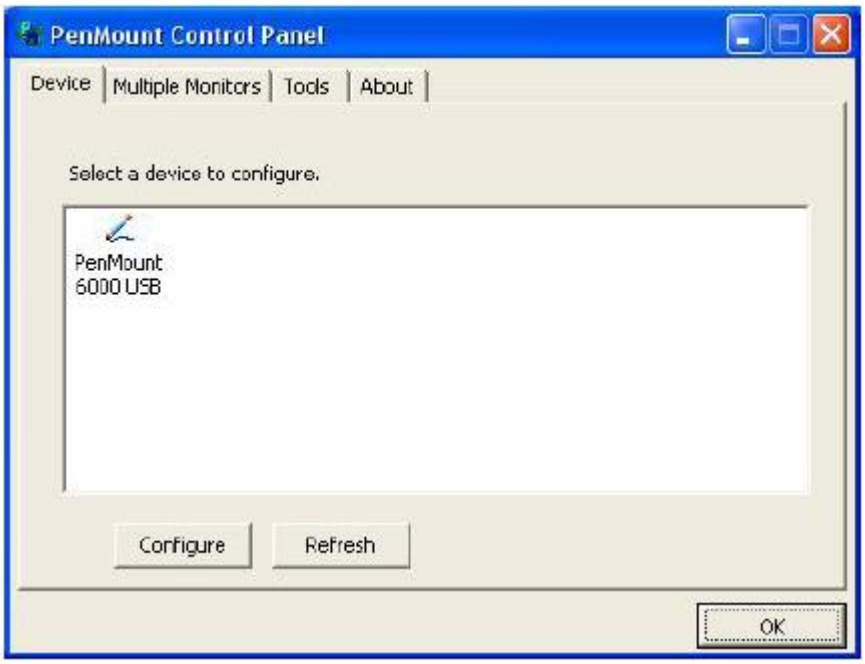

Figure 6-9: Configuration Screen

Step 7: Double click the PenMount 6000 icon as shown in **Figure 6-9**.

Step 8: The calibration initiation screen in **Figure 6-10** appears.

Step 9: Select the Standard Calibration button as shown in **Figure 6-10**.

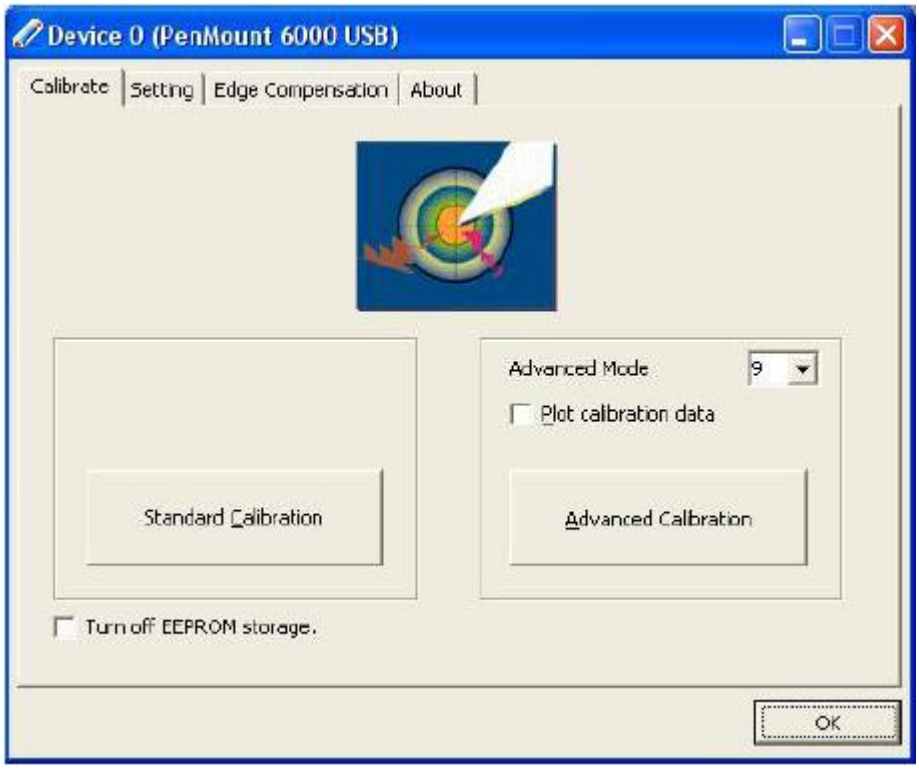

Figure 6-10: Calibration Initiation Screen

Step 10: The calibration screen in is shown. See **Figure 6-11**.

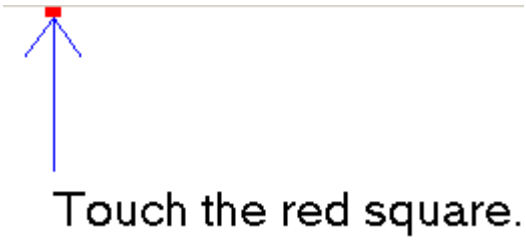

Figure 6-11: Calibration Screen

Step 11: Follow the instructions. The user is asked touch the screen at five specified points after which the screen is calibrated.

Chapter

7

Gasket Replacement

7.1 Gasket Replacement

A gasket used for a long time may gradually lose its ability to protect the monitor from fluids and vapors; scratches or dirt may also accumulate. It is recommended that the gasket be replaced yearly.

NOTE:

If the monitor is mounted vertically, first remove it and place it on a flat, level surface with the display screen facing down before changing the gasket.

Step 1: Remove the old gasket from the sides of the monitor.

Step 2: Attach the new gasket to the monitor. Make sure the gasket fits precisely into the groove along the edges of the monitor's front panel (**Figure 7-1**).

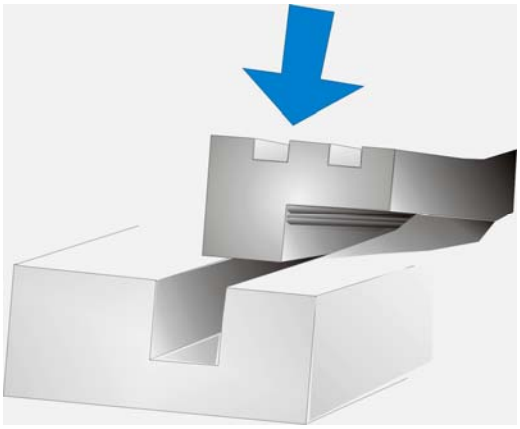

Figure 7-1: Gasket Replacement

NOTE:

Compliance with the IP 65 standard depends on correct installation of the gasket. Be sure to check that the gasket is properly installed after changing it.

Appendix

A

Certifications

A.1 RoHS Compliant

All models in the TDM LCD monitor series comply with the Restriction of Hazardous Materials (RoHS) Directive. This means that all components used to build the industrial workstations and the workstation itself are RoHS compliant.

The RoHS Directive bans the placing on the EU market of new electrical and electronic equipment containing more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants.

A.2 IP 65 Compliant Front Panel

The front panels on all five models in the TDM series LCD monitor series have an ingress protection rating (IP) of 65, IP 65. The front panels are protected from dust particles and water spray.